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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/546,174	04/11/2000	Chih-Chien Liu	JIA 462C1	4793

25235 7590 12/23/2003  
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EXAMINER

SERGEANT, RABON A

ART UNIT	PAPER NUMBER
1711	

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/546,174

**Applicant(s)**

LIU ET AL.

**Examiner**

Rabon Sergeant

**Art Unit**

1711

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 50-93 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 50-93 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 19, 2003 has been entered.
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 50, 52-55, 59-61, and 63-69 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tobben et al. ('126).

Tobben et al. disclose the production of semiconductor devices containing electrically conductive wires on a substrate, wherein the method comprises the deposition and etching of layers that correspond to those claimed by applicants. See figures and columns 2-4. Patentees further teach at column 4, lines 10-26 that if an additional metalization layer is to be used, then a layer of dielectric material is deposited over the surface of the structure and within the grooves between the wiring lines. Patentees additionally teach that this layer may be formed by depositing silicon dioxide using high density plasma deposition techniques. The position is taken that applicants' method fails to exclude the use of a second metalization layer and that the last step of applicants' claimed process is met by the disclosure pertaining to the high density plasma deposition of the dielectric within the grooves between the wiring lines. The subject matter of claim 52 is disclosed at column 2, line 40. The subject matter of claims 53 and 63 is considered to be an inherent characteristic of the disclosed deposition process. The subject matter of claims 54 and 64 is disclosed at column 3, line 13. The subject matter of claim 55 is disclosed by the figures. The subject matter of claim 59 is considered to be an inherent characteristic of the etching process, given that the degree of the etching away of the corners is not specified. The subject matter of claims 60 and 69 is considered to be inherent characteristics

of the disclosed deposition process. The subject matter of claims 65-68 is disclosed within column 4, lines 5-18.

4. Alternatively, in view of the aforementioned teachings within Tobben et al., the position is taken that it would have been obvious to utilize a high density plasma deposition technique to incorporate a dielectric material onto the surface of the wiring line containing substrate and within the grooves between the wiring lines, so as to insulate the wiring lines from external influences.

5. Claims 56-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobben et al. ('126).

As aforementioned within paragraphs 3 and 4, Tobben et al. are considered to disclose a process of filling grooves between conductive lines with dielectric material using high density plasma chemical vapor deposition. While patentees specifically disclose rectangular gaps or grooves, patentees fail to recite other cross-sectional shapes for the grooves, such as trapezoidal or triangular cross-sections; however, the position is taken that the production of such shapes by controlling the parameters of the etching process was known and conventional at the time of invention. Accordingly, the selection of such cross-sections amounts to an obvious design choice and the implementation of such choices requires only the control of result effective variables.

6. The examiner has carefully considered applicants' response, and the prior art rejections have been modified accordingly. Applicants' argument that the cap layer of the prior art lacks a uniform thickness is not well taken in view of the disclosure concerning layer 16b at columns 3, lines 9-11 and figure 2A. Figure 2A indicates that cap layer 16b has a uniform thickness,

considering that the disclosed nonplanar and nonuniform layers, as disclosed by the prior art in the text of the disclosure, are clearly represented within the figures as being nonplanar and nonuniform. Furthermore, given the above discussion concerning thickness uniformity and since the cap layer of the reference and applicants' cap layer are produced from the same materials, namely silicon oxide, the position is taken that applicants' claimed reflective properties are inherent features of the disclosed cap layer.

7. Claims 50-79 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Applicants have failed to provide adequate enablement with respect to how the composition of the cap layer is adapted.

8. Claims 50-79 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Within claims 50 and 61, it is unclear how to interpret the language, "if the cap layer is not present". Specifically, it is unclear what structure or layer the language provides for if the cap layer is not present; in other words, it is unclear what would be present in place of the cap layer.

9. Claims 61-64, 66-74, and 79 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Though the preamble of method claim 61 specifies that the gaps are filled with dielectric material, the claim fails to recite any process step that results in the gaps being filled. The claim merely requires that a layer of the dielectric material is formed on the surface. It is not seen that applicants' response has addressed the issue.

10. Claims 75 and 76 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The protective layer lacks antecedence from claim 52.

11. Claims 50-93 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Support for the amendments to claims 50 and 61 regarding adaptation of the cap layer composition and "uniform thickness" of the cap layer has not been found within the specification. Despite applicants' response, the disclosure within page 11 does not refer to a uniform thickness or define a degree of uniformity. Furthermore, support for the subject matter of claim 80 has not been found within the specification. Despite applicants' argument, the language of original claims 1 and 9 does not provide support for the claimed sequence of layers in claim 80.

12. Claims 80-93 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had

possession of the claimed invention. Applicants have failed to clearly define "adjustable etching component".

13. Claims 80-93 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicants have failed to provide enablement for the adjustment of the etching component to achieve a desired result.

14. With respect to the rejections set forth within paragraphs 12 and 13, the position is maintained that the specification lacks definition and enablement with respect to the language regarding the "adjustable etching component"; applicants' argument is insufficient to establish that the specification provides support for the characteristic of the etching component being adjustable and fails to establish that enablement exists for adjusting the etching component.

15. Claims 80-93 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Despite applicants' response, it remains unclear how "based" is to further limit or define "plasma" or "process". Despite applicants' arguments, it remains unclear to what extent the process is based on or derived from plasma, in that it is unclear with respect to exactly which plasma utilizing processes are encompassed by the language.

16. Claims 80-93 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had



possession of the claimed invention. Despite applicants' response, the specification provides no guidance with respect to what is meant or encompassed by a "plasma based process".

Furthermore, in the absence of such guidance, the language pertaining to a first plasma based process and a second plasma based process constitutes new matter.

17. Claims 80-93 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Despite applicants' response, applicants have failed to provide enablement for the use of processes other than high density plasma chemical vapor deposition for the "first plasma based process". Within the specification, applicants have indicated that other deposition techniques are unsuitable. See pages 3, 4, and 6 of the specification. Therefore, it cannot be argued that enablement has been provided for other deposition processes.

Any inquiry concerning this communication should be directed to R. Sergeant at telephone number (571) 272-1079.

  
RABON SERGENT  
PRIMARY EXAMINER

R. Sergeant  
December 14, 2003